

CLAIMS

What is claimed is:

1. An apparatus for advancing material stock into and through an external holding device seated in a headstock spindle assembly, said apparatus comprising in combination:
 - an elongate body having first and second ends and a cylindrical bore extending lengthwise thereabout defining an interior chamber;
 - a plunger assembly housed within said interior chamber and operably working longitudinally therewithin;
 - an end plug fixedly attached to said first end to retain axial positioning of said plunger assembly within said interior chamber while operably moving toward and away from said first and second ends; and
 - means for attaching said second end of elongate body to the external holding device.
- 15 2. An apparatus as set forth in claim 1, wherein said end plug further comprises a threaded section situated in between external and internal ends thereof, said threaded section being threadably attached to a threaded portion of said first end to permit said internal end to reside within said interior chamber.
- 20 3. An apparatus as set forth in claim 2, wherein said external end comprises a geometric configuration substantially conforming to the geometric shape of said elongate body to serve as means for grasping and handling said end plug and gain access to said interior chamber for purposes of maintenance and repair.
- 25 4. An apparatus as set forth in claim 2, wherein said internal end comprises a neck having a smaller diameter than said external end and said threaded section and extending inwardly within said interior chamber a predetermined distance to engage and stabilize said plunger assembly during cyclic operation.
5. An apparatus as set forth in claim 1, wherein said end plug further comprises a venting bore extending lengthwise thereabout to serve in equalizing pressure while said plunger assembly operably moves longitudinally within said interior chamber.

6. An apparatus as set forth in claim 1, wherein said attaching means comprises a threaded section having a thread arrangement substantially equivalent to a threaded end section of the external holding device.

7. An apparatus as set forth in claim 1, wherein said attaching means 5 comprises a keyed portion at said second end adaptably fitted to an equivalent structure made part of the external holding device, permanently being fastened to one another by a bead of weld.

8. An apparatus as set forth in claim 1, wherein said plunger assembly 10 comprises means for biasing a ram having a cylindrical stop situated in between a spring retainer and a shaft having an inwardly conical depression at its end to engage an end of material stock, said cylindrical stop comprising an annular spring seat having an inner wall in common with the outside diameter of said spring retainer.

9. An apparatus as set forth in claim 8, wherein said cylindrical stop further 15 comprises an outer facing wall substantially formed by the diametric difference of said cylindrical stop and said shaft, said second end comprising a retention slot for housing therein a retaining clip having an inner surface portion momentarily engaging said outer facing wall as said plunger assembly cyclically travels within said interior chamber toward said second end of elongate body.

10. An apparatus as set forth in claim 8, wherein said biasing means comprises 20 a spring having one end slidably positioned onto said spring retainer and seated into said annular spring seat and a second end mounted to said end plug.

11. An apparatus as set forth in claim 8, wherein said biasing means comprises 25 more than one spring situated in between one less in number of intermediate spring guides each having a cylindrical midsection situated in between first and second retaining ends, said cylindrical midsection comprising a pair of annular spring seats each having an innermost wall in common with the outer diameter of said first and second retaining ends.

12. An apparatus as set forth in claim 11, wherein said end plug and said elongate body are fabricated from carbon steel substantially coated with black zinc and said intermediate spring guide is fabricated from a light-weighted polymeric material.

13. An apparatus as set forth in claim 1, wherein said end plug and said elongate body each comprise a pair flattened sections diametrically positioned to assist in turning said end plug about said elongate body.

14. An apparatus as set forth in claim 1, further comprising a stabilizer sleeve 5 having an inner opening centrally located thereabout to slidably fit over and onto said elongate body and a pair of recessed cavities each receiving therein a set screw threadably extending inward to tighten said stabilizer sleeve to said elongate body which collectively mitigates the occurrence of vibration while being accommodated within the headstock spindle assembly.

10 15. An apparatus for advancing material stock into and through an external holding device seated in a headstock spindle assembly, said apparatus comprising in combination:

an elongate body having first and second ends and a cylindrical bore extending lengthwise thereabout defining an interior chamber, said second end comprising a 15 threaded section having a thread arrangement substantially equivalent to a threaded end section of the external holding device;

a plunger assembly housed within said interior chamber and operably working longitudinally therewithin, said plunger assembly comprising means for biasing a ram having a cylindrical stop situated in between a spring retainer and a shaft having an 20 inwardly conical depression at its end in engagement with material stock, said cylindrical stop comprising an annular spring seat having an inner wall in common with the outside diameter of said spring retainer, said cylindrical stop comprising an outer facing wall substantially formed by the diametric difference of said cylindrical stop and said shaft, said second end comprising a retention slot for housing therein a retaining clip having an 25 inner surface portion momentarily engaging said outer facing wall as said plunger assembly cyclically travels within said interior chamber toward said second end of elongate body; and

an end plug fixedly attached to said first end to retain axial positioning of said plunger within said interior chamber while operably moving toward and away from said

first and second ends, said end plug comprising a threaded section situated in between external and internal ends thereof and a venting bore extending lengthwise thereabout to serve in equalizing pressure while said plunger assembly operably moves longitudinally within said interior chamber, said threaded section being threadably attached to a
5 threaded portion of said first end to permit said internal end to reside within said interior chamber.

16. An apparatus as set forth in claim 15, wherein said biasing means comprises a spring having one end slidably positioned onto said spring retainer and seated into said annular spring seat of said cylindrical stop and a second end engaged to
10 said end plug.

17. An apparatus as set forth in claim 15, wherein said biasing means comprises more than one spring situated in between one less in number of intermediate spring guides each having a cylindrical midsection situated in between first and second retaining ends, said cylindrical midsection comprising a pair of annular spring seats each
15 having an innermost wall in common with the outer diameter of said first and second retaining ends.

18. A method for advancing material stock into and through an external holding device seated in a headstock spindle assembly, said method comprising the steps of:

20 placing a plunger assembly into an elongate body having first and second ends and a cylindrical bore extending lengthwise thereabout defining an interior chamber, said plunger assembly comprising means for biasing a ram having a cylindrical stop situated in between a spring retainer and a shaft having an inwardly conical depression at its end for receiving an end of material stock, said cylindrical stop comprising an annular spring
25 seat having an inner wall in common with the outside diameter of said spring retainer, said cylindrical stop comprising an outer facing wall substantially formed by the diametric difference of said cylindrical stop and said shaft, said second end comprising a retention slot for housing therein a retaining clip having an inner surface portion

momentarily engaging said outer facing wall as said plunger assembly cyclically travels within said interior chamber toward said second end of elongate body;

attaching an end plug to said first end to retain axial positioning of said plunger within said interior chamber while operably moving toward and away from said first and
5 second ends, said end plug comprising a threaded section situated in between external and internal ends thereof and a venting bore extending lengthwise thereabout to serve in equalizing pressure while said plunger assembly operably moves longitudinally within said interior chamber, said threaded section being threadably attached to a threaded portion of said first end to permit said internal end to reside within said interior chamber;
10 and

providing means for attaching said second end of elongate body to the external holding device.

19. An apparatus as set forth in claim 18, wherein said biasing means comprises more than one spring situated in between one less in number of intermediate
15 spring guides each having a cylindrical midsection situated in between first and second retaining ends, said cylindrical midsection comprising a pair of annular spring seats each having an innermost wall in common with the outer diameter of said first and second retaining ends.

20. An apparatus as set forth in claim 18, wherein said attaching means comprises a threaded section having a thread arrangement substantially equivalent to a
20 threaded end section of the external holding device.

21. An apparatus as set forth in claim 18, further comprising the step of engaging an end of material stock with said inwardly conical depression and movably positioning the material stock inwardly within said interior chamber until said plunger
25 assembly is in a fully compressive state.

22. An apparatus for advancing material stock into and through an external holding device seated in a headstock spindle assembly, said apparatus comprising in combination:

a tubular housing having a distal end for receiving an end cap having inner and outer members and a longitudinal bore extending therethrough and a proximal end comprising means for attaching said tubular housing to the external holding device; and
5 a drive assembly housed within said tubular housing and operably working longitudinally therewithin and comprising means for advancing said drive assembly to and from said distal and proximal ends.

23. An apparatus as set forth in claim 22, wherein said drive assembly comprises an elongate rod having a predetermined length and a first threaded end having a pair of locking nuts threadably attached thereto to limit the extent to which said first 10 end extends beyond said distal end and a second threaded end having a material pusher threadably attached thereto to engage an end of material stock, said material pusher comprising a locking nut to ensure a tightened position while operably acting in conjunction with said drive assembly.

24. An apparatus as set forth in claim 22, further comprising a stabilizer sleeve 15 having an inner opening centrally located thereabout to slidably fit over and onto said tubular housing and a pair of recessed cavities each receiving therein a set screw threadably extending inward to tighten said stabilizer sleeve to said tubular housing which collectively mitigates the occurrence of vibration while being accommodated within the headstock spindle assembly.

20 25. An apparatus as set forth in claim 23, wherein said advancing means comprises a spring slidably positioned about said rod and having one end abutting said pair of locking nuts at said distal end and a second end abutting said material pusher at said proximal end.

26. An apparatus as set forth in claim 25, wherein said first and second 25 threaded ends of said rod each receive an end positioned washer to abut said spring ends.

27. An apparatus as set forth in claim 23, wherein said advancing means comprises more than one spring slidably positioned about said rod and situated in between washers having an outer diameter slightly less than the effective inner diameter

of said tubular housing to ensure axial positioning of said springs during cyclic movement of said drive assembly.

28. An apparatus as set forth in claim 22, wherein said attaching means comprises a threaded section having a thread arrangement substantially equivalent to a
5 threaded end section of the external holding device.

29. An apparatus as set forth in claim 22, wherein said attaching means comprises a keyed portion at said second end adaptably fitted to an equivalent structure made part of the external holding device, permanently being fastened to one another by a bead of weld.

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